

Air Force Civil Engineer Center



FORMER
WILLIAMS AIR FORCE BASE

Site ST012

**Former Liquid Fuel
Storage Area**

**BCT Conference Call
15 November 2018**

Battle Ready...Built Right!



Site ST012 Outline

- **Summary of activities since Oct BCT meeting**
- **Update on SVE system**
- **LNAPL monitoring/removal update**
- **Summarize injection/ extraction modifications**
- **Path forward**



Site ST012 Activities Since Sept

- Continued SVE operation
- Continued LNAPL screening in accessible wells
- Additional iron speciation testing (evaluating results)
- Annual groundwater sampling event (plus select perimeter wells)
- Operation of Extraction and Treatment
 - Perform pump maintenance and repair as needed
 - Five additional pumps on order

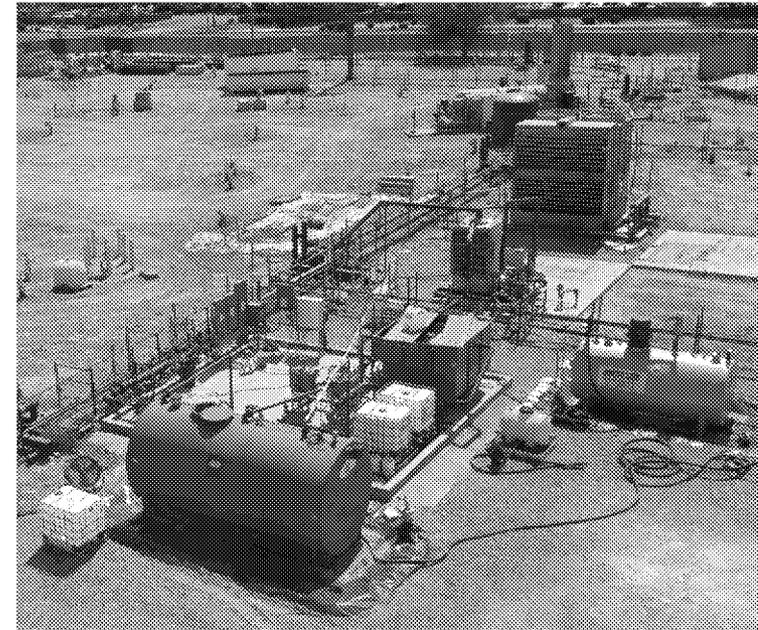




Site ST012 Activities Since September

• Evaluating Off-Gas Treatment

- No LNAPL has been recovered since extraction started up
- Benzene air stripper influent concentration has fluctuated but appears to be stabilizing around 1,400 $\mu\text{g/L}$
 - 2 May – 310 $\mu\text{g/L}$
 - 1 Jun – 1,400 $\mu\text{g/L}$
 - 5 Jul – 76 $\mu\text{g/L}$
 - 14 Sep – 1,400 $\mu\text{g/L}$
 - 3 Oct – 1,500 $\mu\text{g/L}$
- Installed catalyst (late Sept) in thermal oxidizer for air stripper off-gas
- Planning in progress to use thermal oxidizer from ST035 for flame oxidizer at ST012





Soil Vapor Extraction System Update



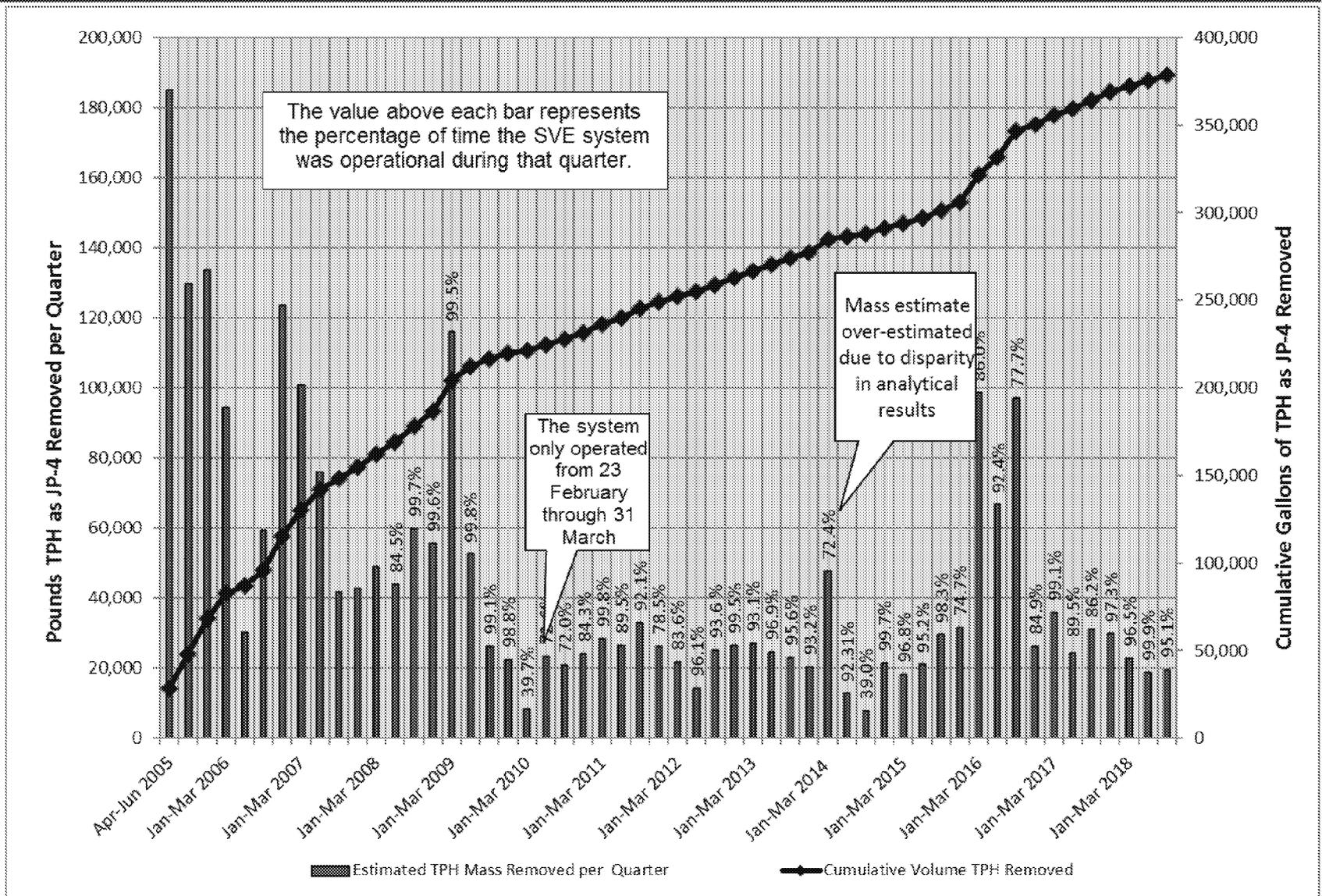
ST012 SVE System Update

- **Jul – Sep 2018**
 - Thermox switched to catalytic mode in Sep
 - 90.5% operational uptime Thermox; 99.8% operational uptime Flameox
 - Total petroleum hydrocarbon (TPH) removed – 19,831 pounds or 3,018 gallons





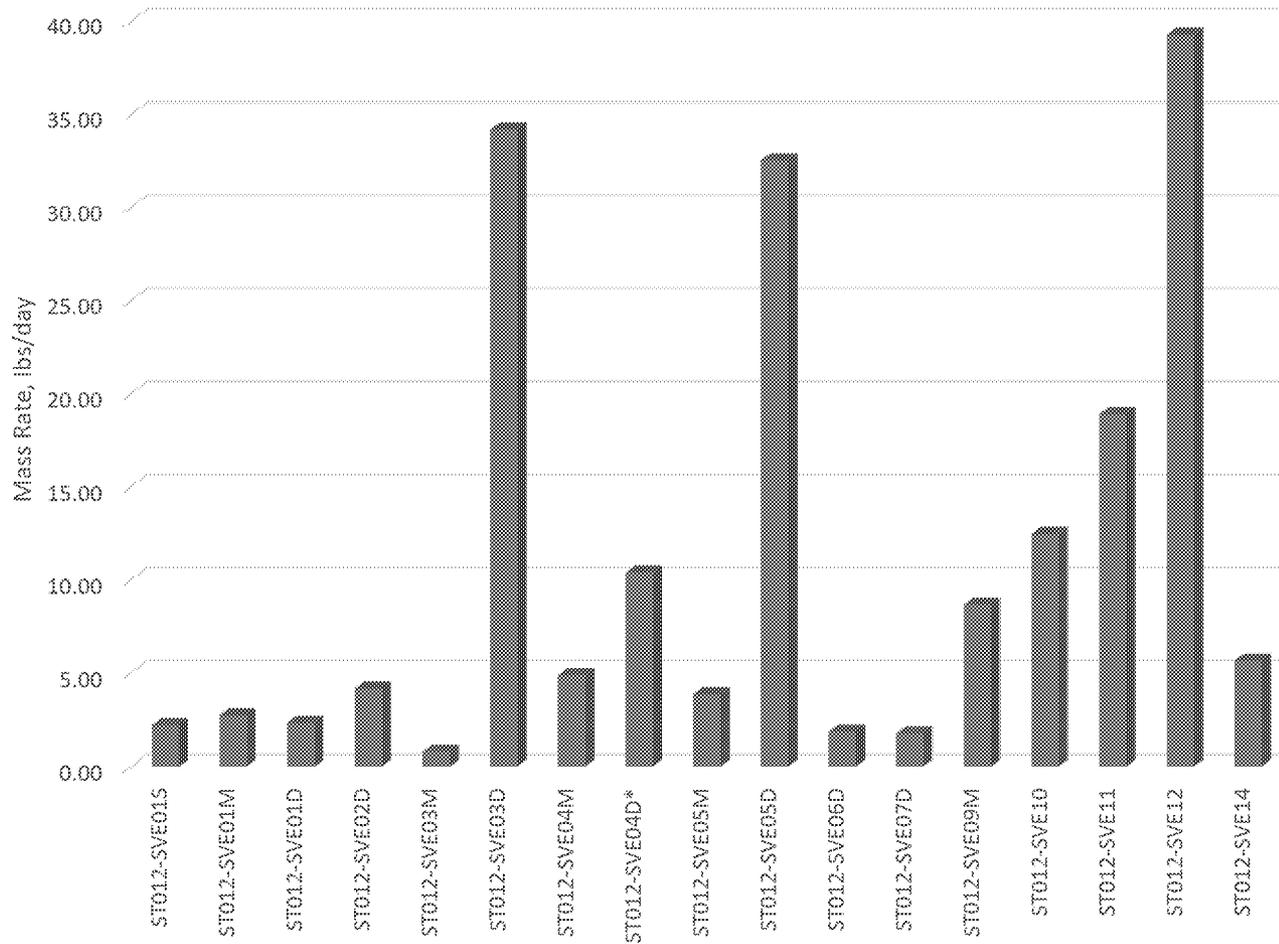
Site ST012 SVE System Performance





Site ST012 SVE System Performance

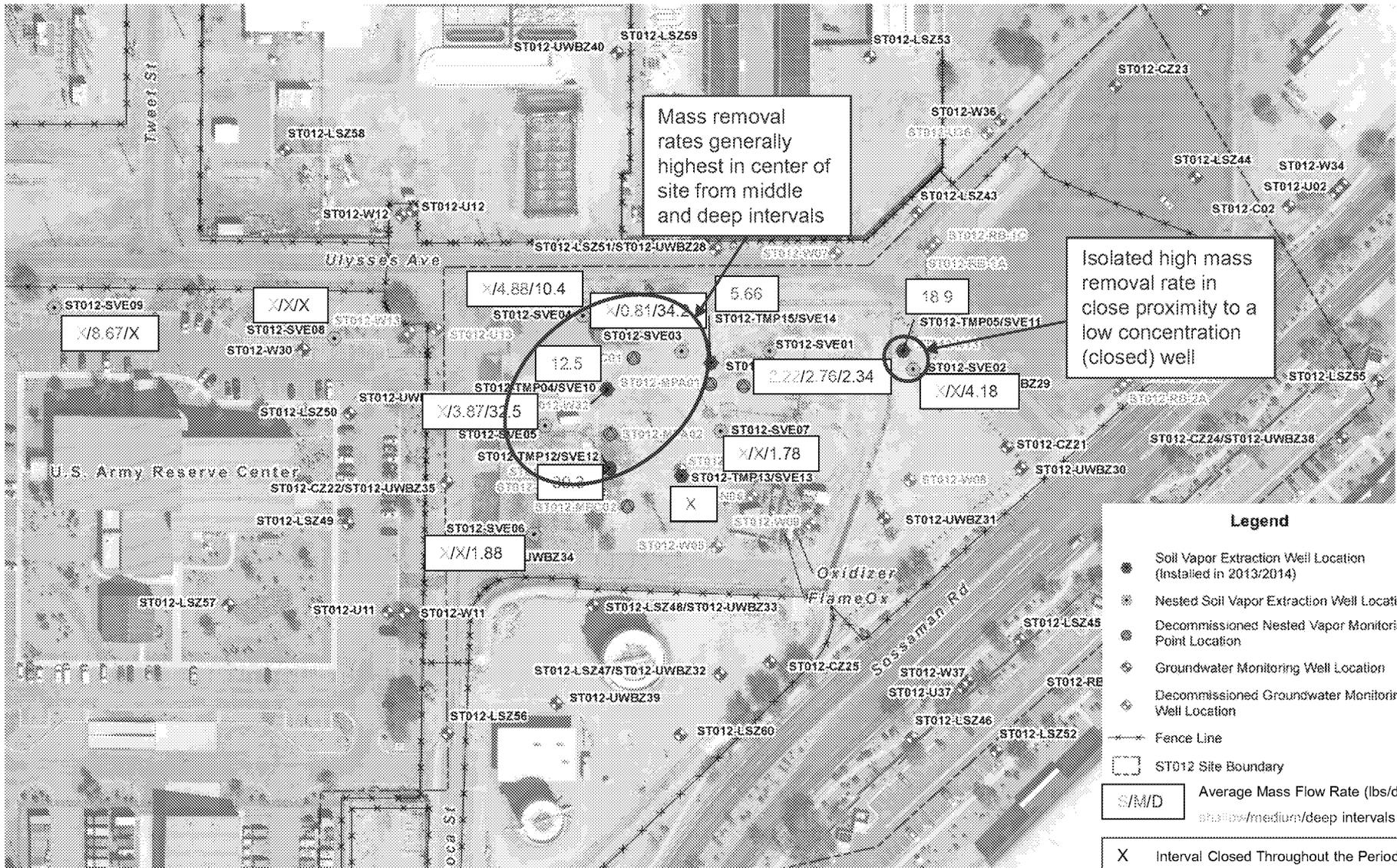
Individual Well TPH Mass Rate for Q3 2018



*Injection pipe installed in SVE04D. Flow rate averaged based on wellhead vacuum.



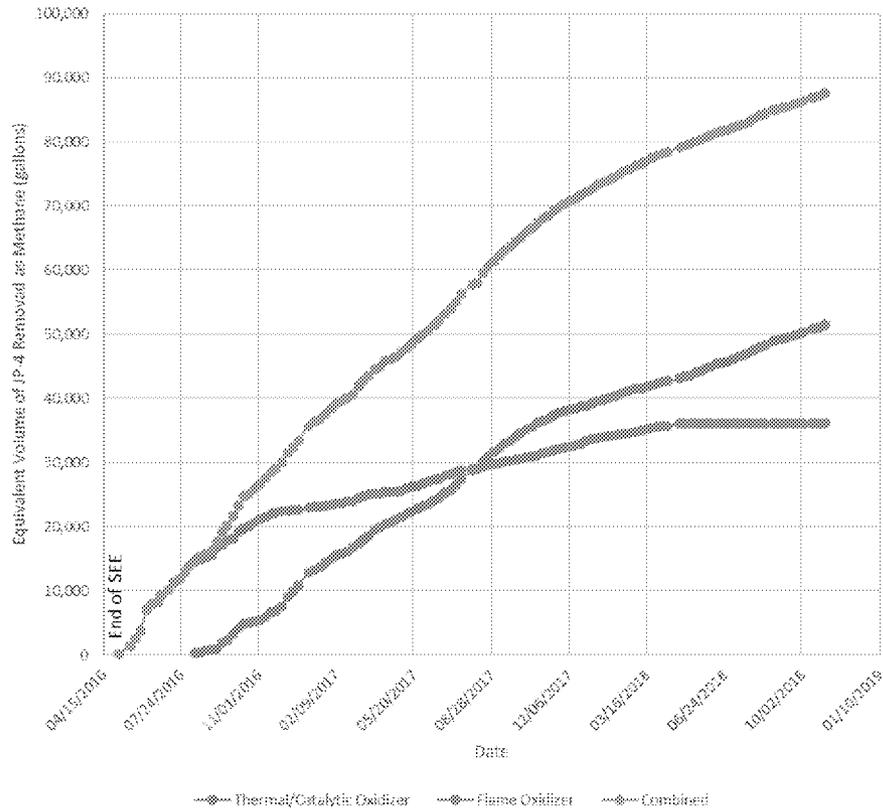
Site ST012 SVE System Performance



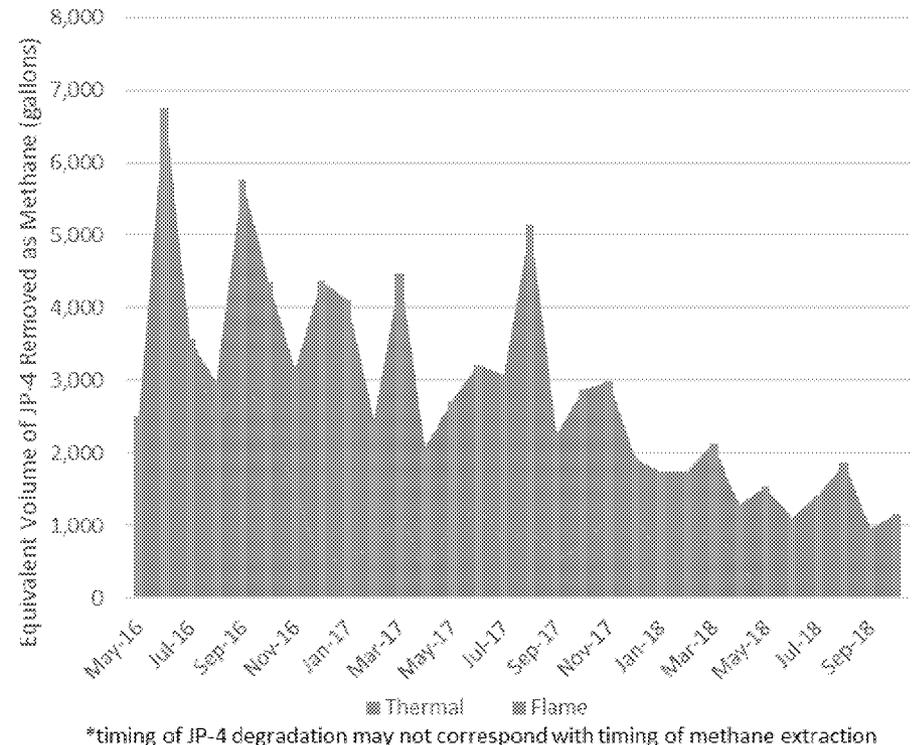


Site ST012 SVE System Equivalent JP-4 Degradation Based on Methane Removed

Equivalent JP4 Degraded based on Methane Extracted by SVE System



Equivalent JP-4 Degraded (based on methane extracted by SVE system by month*)



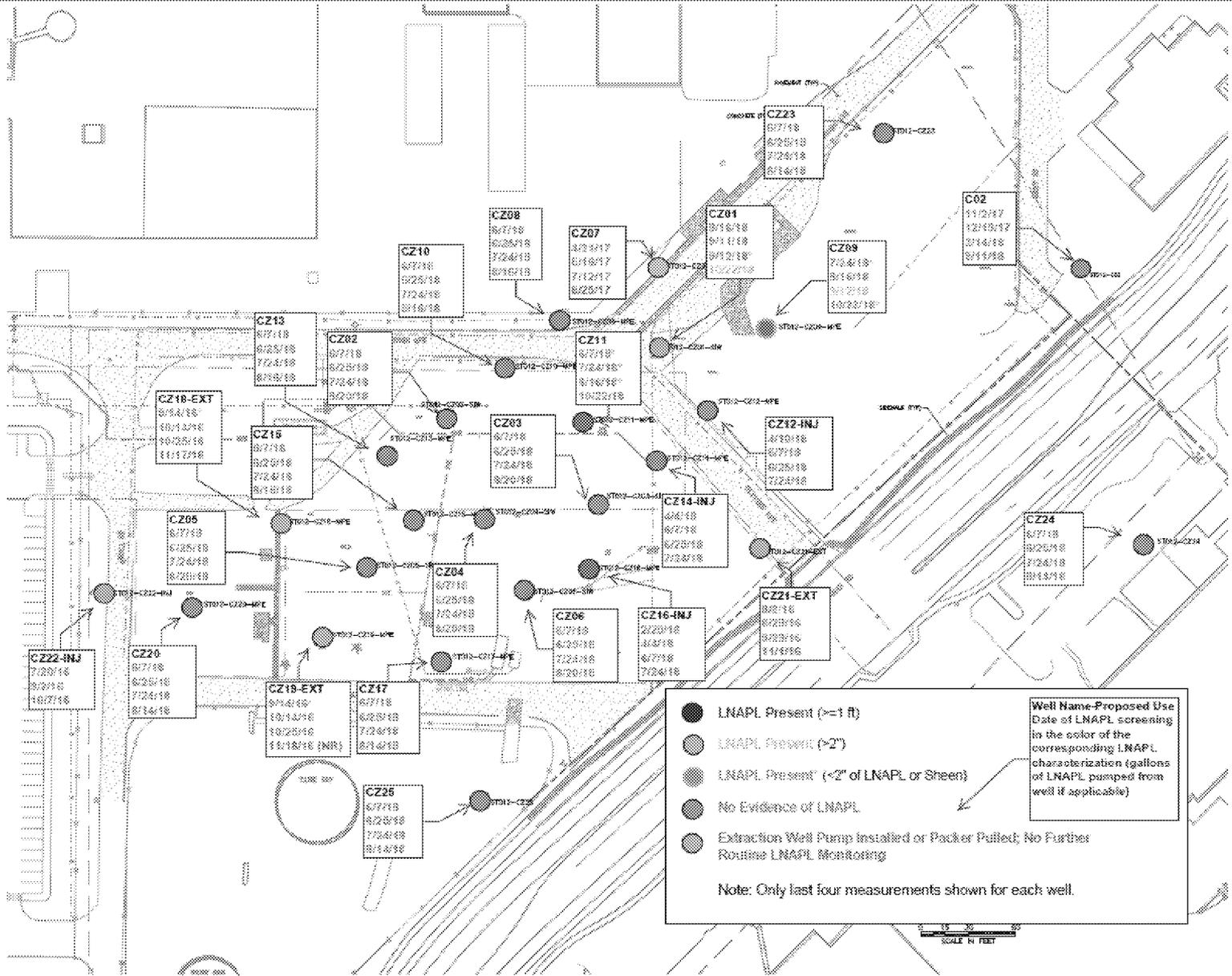
- Estimates through 25 Oct 2018.
- Estimated JP-4 degradation as methane is in addition to JP-4 removal reported for SVE
- Thermal oxidizer changed from SVE to groundwater treatment end of Apr
- Average Equivalent JP-4 Degraded since May-16 (end of SEE) ~26,000 pounds per month (~4,000 gallons per month)
- Recent equivalent JP-4 degraded ~10,000 pounds per month (~1,500 gallons per month)



LNAPL Monitoring Update (through 29 Oct)

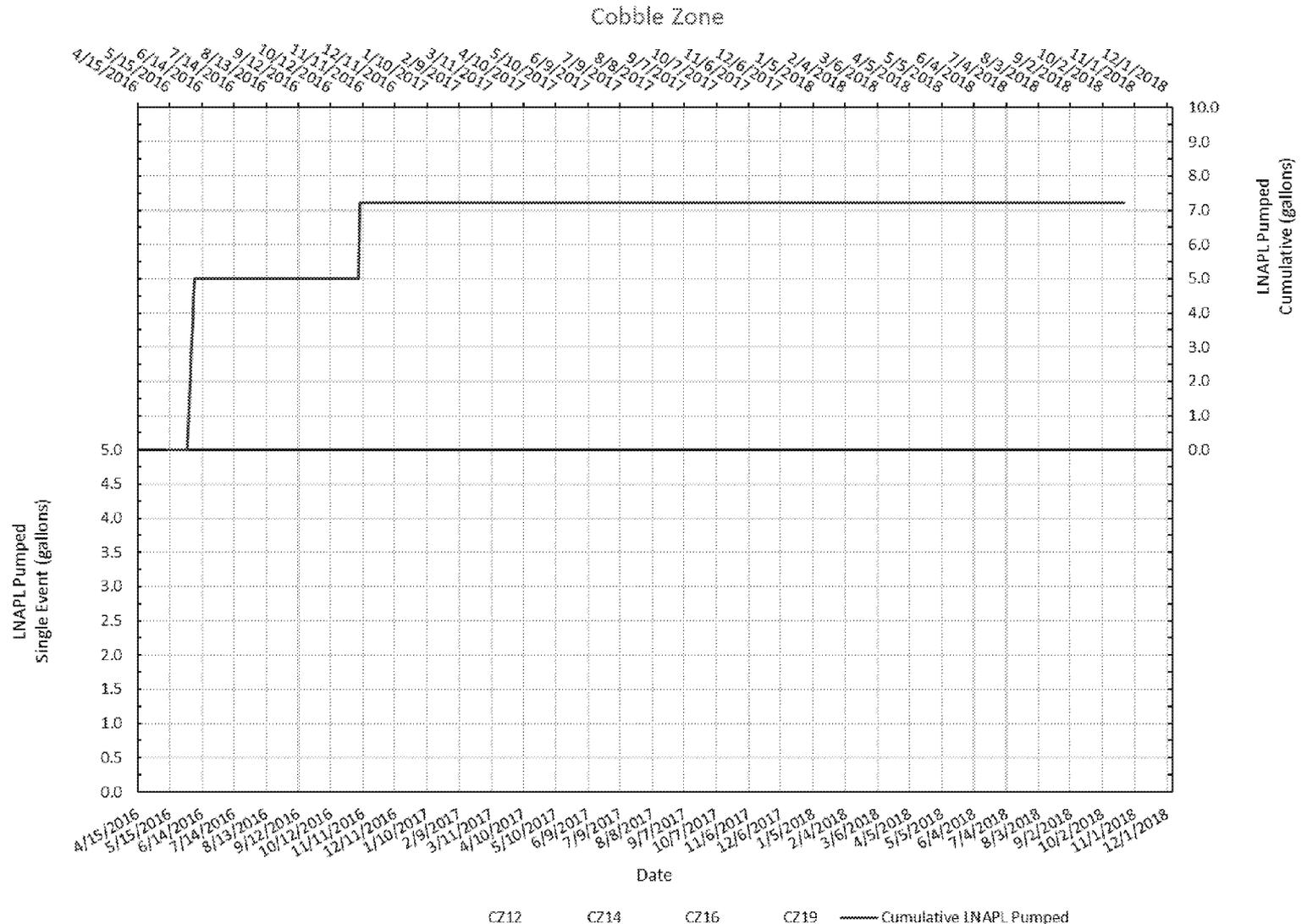


LNAPL Monitoring/Removal Status Cobble Zone



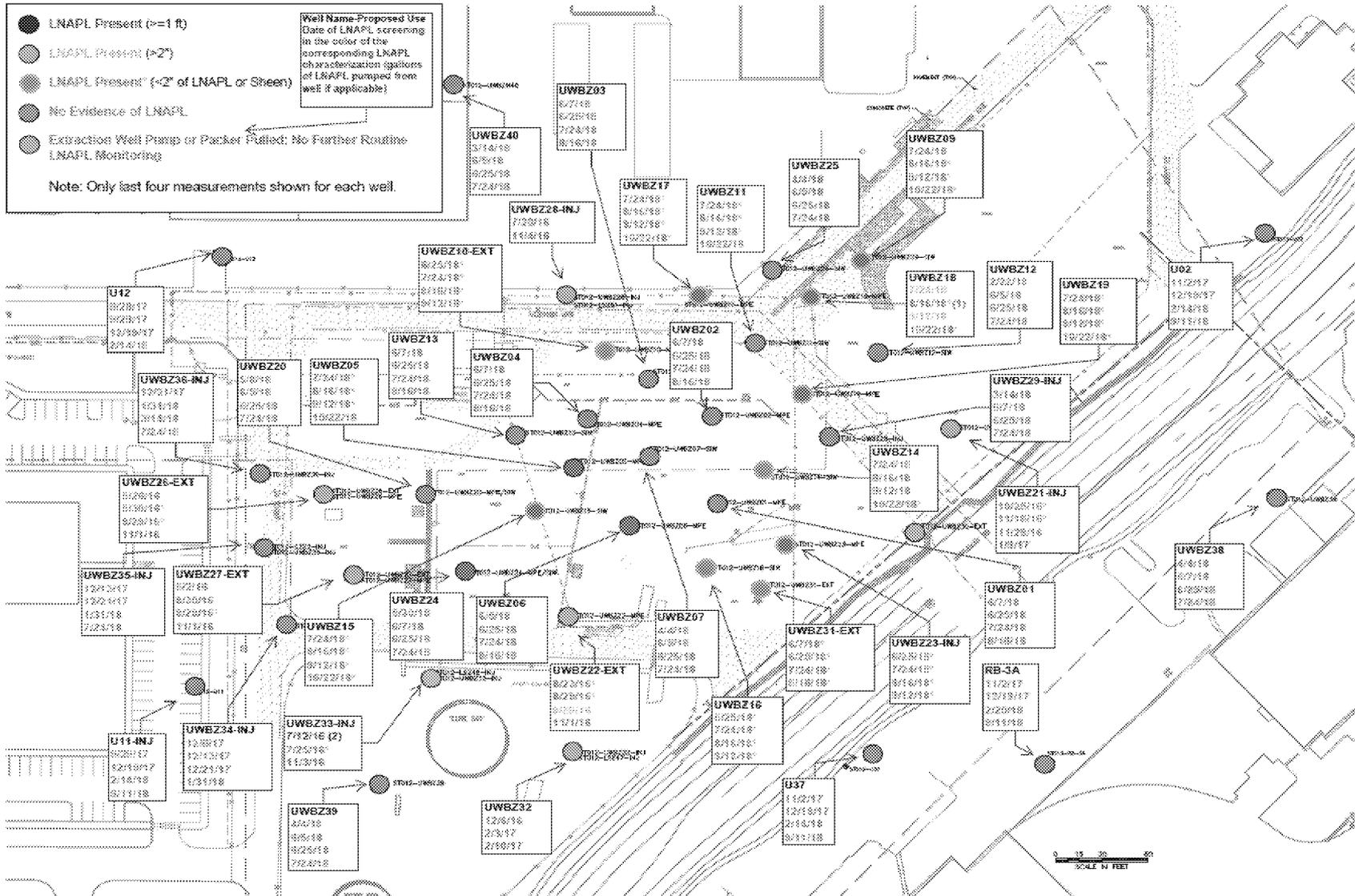


LNAPL Monitoring/Removal Status Cobble Zone





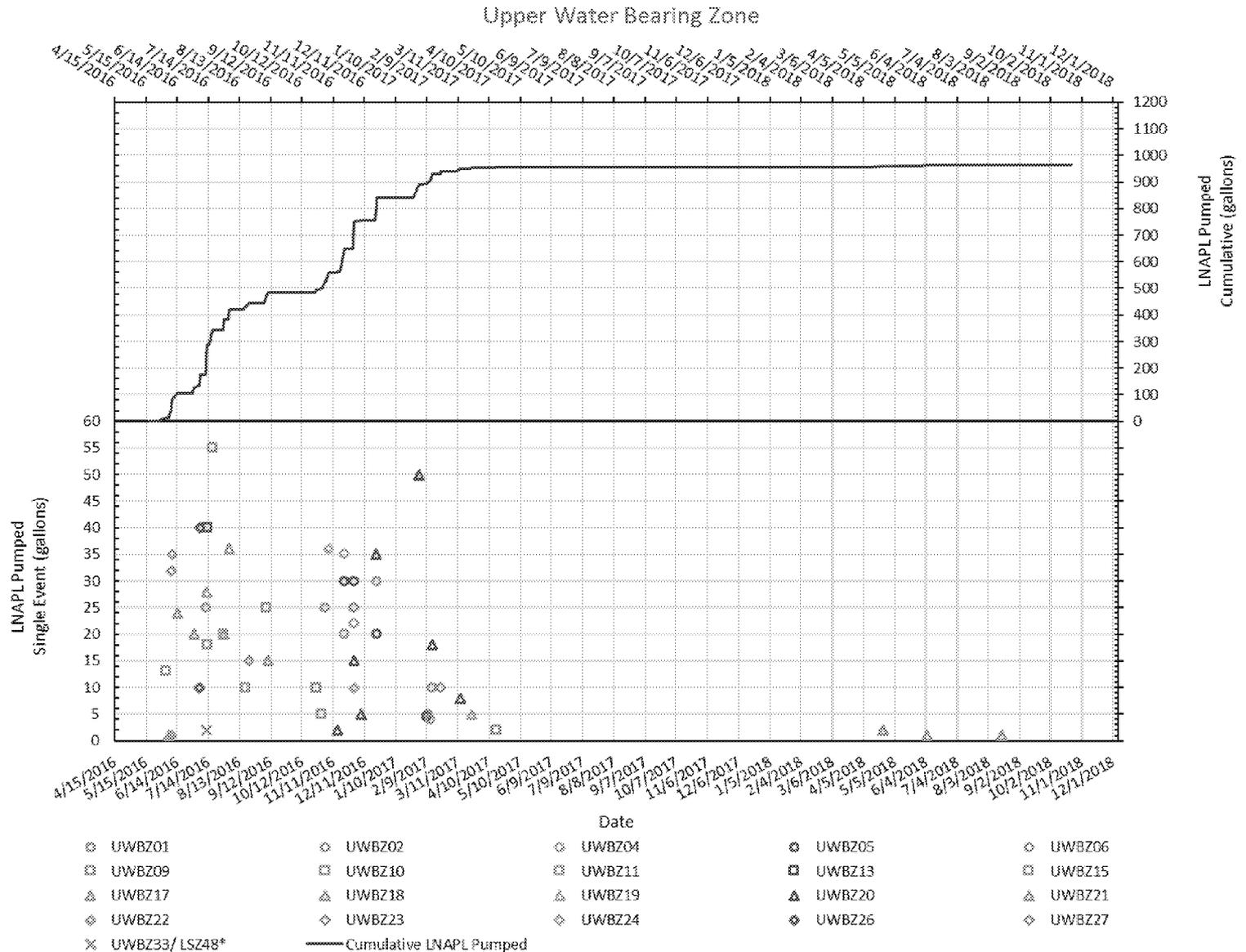
LNAPL Monitoring/Removal Status Upper Water Bearing Zone



SCALE IN FEET



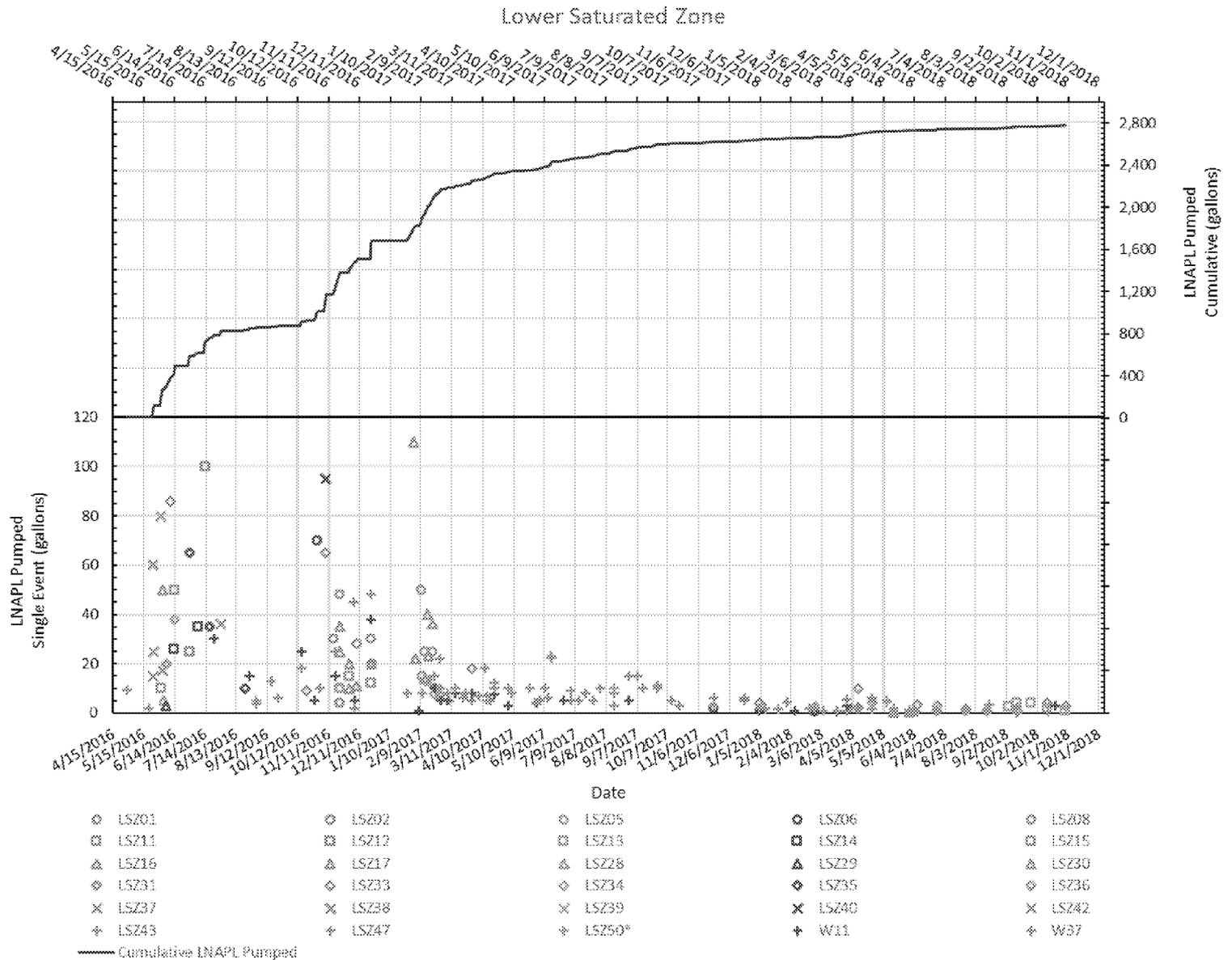
LNAPL Monitoring/Removal Status Upper Water Bearing Zone





LNAPL Monitoring/Removal Status

Lower Saturated Zone

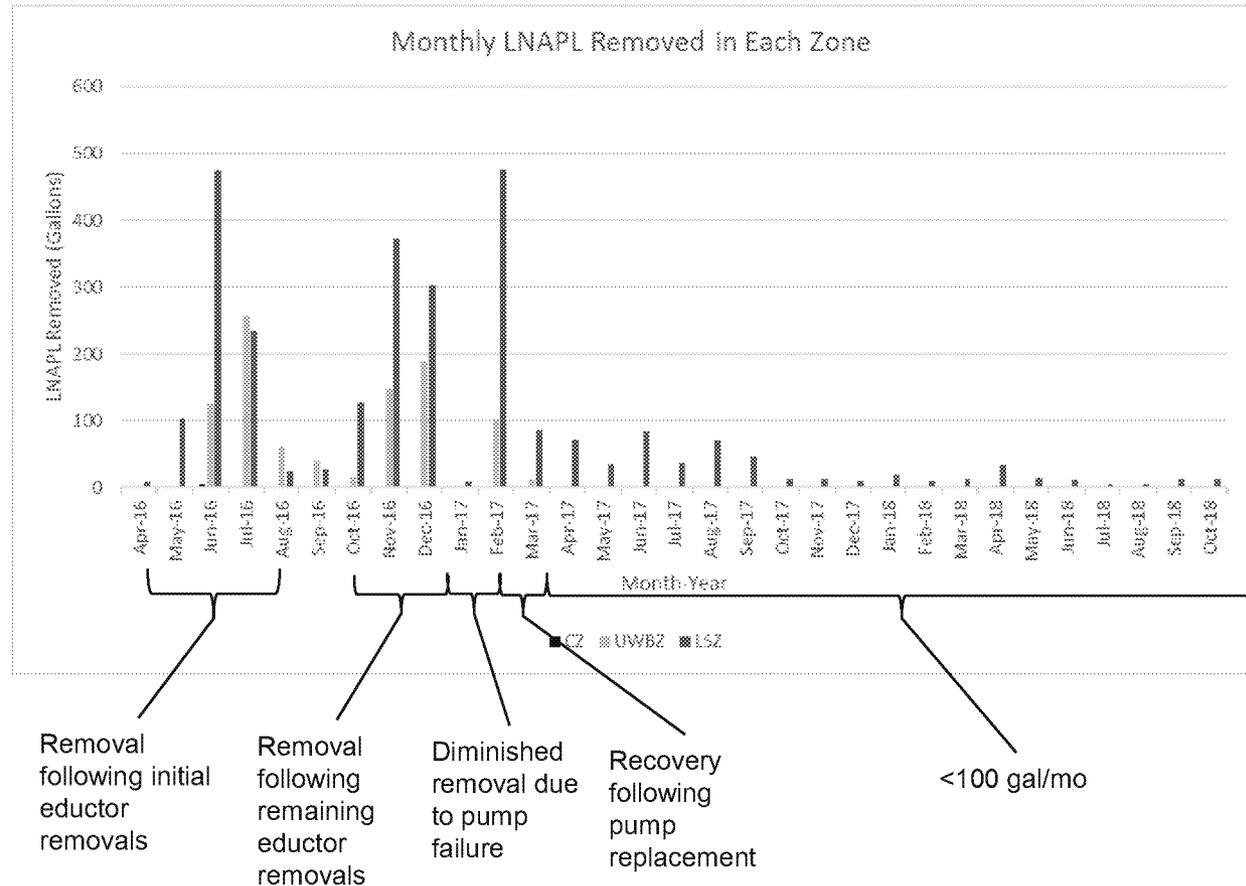


11/14/2018



ST012 LNAPL Monitoring/Removal Summary

- **CZ – 7 gallons of LNAPL removed. None since Nov 2016**
- **UWBZ - 962 gallons of LNAPL removed. None removed since Aug 2018**
- **LSZ - 2,778 gallons of LNAPL removed. 14 gallons removed since Oct update (W11, W37, LSZ13, LSZ36, LSZ43).**





Injection/Extraction Plan



FVM 7 – Pilot Study Injection-Extraction Modifications

- **Modifications made to:**
 - Reflect most recent dissolved benzene concentrations
 - Address regulatory concern regarding potential migration in downgradient areas
- **Cobble Zone**
 - Eliminated injections in downgradient areas due to low benzene concentrations but will continue extractions



FVM 7 – Pilot Study Injection-Extraction Modifications

- **Upper Water Bearing Zone**

- Eliminated injections in some downgradient areas due to low benzene concentrations
- Reduced initial injection mass (spread same mass over longer time interval) in downgradient hotspot areas
- Relocate some injected sulfate to better target higher dissolved benzene

- **Lower Saturated Zone**

- Eliminated injections in some downgradient areas due to low benzene concentrations
- Reduced initial injection mass in downgradient areas to minimize potential migration
- Relocate some injected sulfate to better target higher dissolved benzene



Site ST012 Path Forward Nov-Dec

- **Continued SVE operation**
- **Pilot Study Implementation**
 - First injection week of Nov 12 – UWBZ36
 - Second injection week of Nov 26 – UWBZ33
 - Install new extraction pumps in Dec
 - Continue injections into Dec
- **Replace flame oxidizer with ST035 oxidizer for ST012 SVE in Dec**
- **Reduce CZ23 sampling frequency to quarterly unless November result is above MCL (continue CZ07 extraction)**